Having described the invention, the following is claimed:

1. A method of forming a microporous fluoropolymer sheet, comprising the steps of:

irradiating a sheet of fluoropolymer at a dosage level below the rupture energy of the carbon-to-fluorine (C-F) bonds of the fluoropolymer, but sufficient to rupture carbon-to-carbon (C-C) bonds; and

exposing the sheet of fluoropolymer to an etchant for a period of time sufficient to etch away disrupted atoms and molecules, wherein continuous micropassages are formed through said sheet.

2. A method as defined in claim 1, wherein said dose level is between 5 kGy and 50 kGy.

3. A method as defined in claim 2, wherein said sheet of fluoropolymer has a thickness between 1 and 15 mm.

4. A method as defined in claim 1, wherein said step of irradiating comprises moving a generally continuous film of fluoropolymer past a stationary source of electrons.

5. A method as defined in claim 4, wherein said source of electrons is an electron beam from an electron accelerator.

6. A method as defined in claim 4, wherein said source of electrons is comprised of a target material exposed to x-rays.

7. A method as defined in claim 4, wherein said source of irradiation is an isotope.

8. A method as defined in claim 1, wherein said dosage level is between 5 kGy and 20 kGy.

9. A method as defined in claim 1, wherein said etchant is a liquid.

10. A method as defined in claim 9, wherein said etchant is selected from the group consisting of sodium or other chemical solutions, such as ethylene glycol dimethyl ether (MONOGLYME), diethylene glycol dimethyl ether (DIGLYME) or tetraethylene glycol dimethyl ether (TETRAGLYME).

11. A method as defined in claim 1, wherein said etchant is a gas.

12. A method as defined in claim 11, wherein said etchant is fluorine.

13. A method as defined in claim 1, wherein said sheet of fluoropolymer is one of several sheets simultaneously exposed to said electrons.

14. A method as defined in claim 13, wherein said several sheets of fluoropolymer are layered one on another into a stack and said electrons radiate through said stack.

15. A method as defined in claim 1, wherein said irradiated fluoropolymer sheet is etched in a liquid etchant within an electric field that produce an electrophoresis effect in said liquid etchant.

16. A method as defined in claims 1, 2, 3, 4, 12, 13 or 14, wherein said fluoropolymer is polytetrafluoroethylene (PTFE).

17. A method as defined in claim 1, wherein said step of irradiating occurs with an oxygen-bearing medium supplied to an area where said fluoropolymer sheet is irradiated.

18. A method as defined in claim 17, wherein said oxygen-bearing medium is a fluid.

19. A method as defined in claim 18, wherein said oxygen-bearing medium is water.

20. A method as defined in claim 19, wherein said water is sprayed onto said fluoropolymer sheet.

21. A method as defined in claim 17, wherein said oxygen-bearing medium is a gas.

22. A method as defined in claim 21, wherein said gas is oxygen.

23. A method as defined in claim 17, wherein said fluoropolymer is polytetrafluoroethylene (PTFE).

24. A method as defined in claim 1, wherein said sheet is a generally continuous film having a thickness between about 10μm (microns) and 200μm (microns), and said film is continuously conveyed past a stationary source of irradiation.

25. A method as defined in claim 24, wherein said film is conveyed through an etchant following said irradiation step.

26. A method as defined in claim 1, wherein said sheet has a thickness of about 10μm (microns) and 15 mm, and said sheet is irradiated and etched as an individual piece.

27. A method of forming a microporous fluoropolymer, comprising the steps of:

irradiating a fluoropolymer material at a dosage level below the rupture energy of the carbon-to-fluorine (C-F) bonds of the fluoropolymer material, but sufficient to rupture carbon-to-carbon (C-C) bonds;

exposing said fluoropolymer material to an etchant for a period of time sufficient to etch away disrupted atoms and molecules within said material; and

removing said fluoropolymer material from said etchant when continuous micro-passages are formed through said fluoropolymer material.

28. A method as defined in claim 27, wherein said fluoropolymer material is polytetrafluoroethylene (PTFE).

29. A method as defined in claim 28, wherein said polytetrafluoroethylene (PTFE) is a sheet having a thickness between about 10μm and 30 mm.

30. A method as defined in claim 29, wherein said sheet is a film having a thickness between about 10μm and 200μm.

31. A method as defined in claim 28, wherein said polytetrafluoroethylene (PTFE) is irradiated from a single source.

32. A method of forming a microporous polymeric material from an organic polymer, comprising the steps of:

irradiating an organic polymeric material at a dosage level sufficient to rupture carbon-to-carbon (C-C) bonds, but below the rupture energy of a carbon-to-"x" bond that has a rupture energy greater than a carbon-to-carbon (C-C) bond, where "x" is at least one elemental material that forms a bond with carbon;

exposing the polymeric material to an etchant for a period of time to etch away disrupted atoms and molecules in said polymeric materials; and

terminating exposure to said etchant when continuous micro-passages are formed through said polymeric material.